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COMPLETE SPECIFICATION

Filter Elements

We, COURTAULDS LIMITED, a British Company, of 18, Hanover Square, London, W.1., England, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following Statement:—

This invention relates to the production of filter elements and in particular to filter elements in cylindrical form suitable for use as filter tips in cigarettes.

It has previously been proposed to produce the filter tips for cigarettes from filamentary material such as cellulose acetate by forming a band of the filament by opening a tow, spraying a plasticiser for the polymeric material on to the band and condensing the band into cylindrical form of the shape and size required. In such a process the final filter elements are held in their desired shape by adhesion of the filaments one to the other as a result of contact of the plasticised areas with other filaments.

The present invention is concerned with the manufacture of filter elements which are suitable for use in the production of cigarette filter tips and it will be understood that the cylindrical filter elements referred to in this specification include elements having a cross-section in the form of a curve other than a circle, such as, for example, elliptical cross-section.

According to the invention, a process for the production of filter elements comprises forming a bundle of unplasticised filaments or fibres, condensing the bundle into a cylindrical shape of the required dimensions and applying around the formed cylindrical element a wrapper which is bonded to the outer layer of the bundle of filaments or fibres.

The bundle of filamentary or fibrous material may be composed of continuous filaments or staple fibres. Continuous filament material may be conveniently fed to the condensing tube of a conventional cigarette making machine in the form of a tow, while staple fibres

may be fed to such a condensing tube in the form of a sliver. When a tow of continuous filaments is employed it is preferably in a well opened state. In either case, the filaments or fibres should possess some degree of crimp.

The condensed bundle of filaments or fibres is wrapped with the wrapper according to the invention, by any suitable method, for example in accordance with normal cigarette wrapping techniques, and the wrapper may be applied with its edges perpendicular to the longitudinal axis of the bundle, or it may be wound helically, if desired. The wrapper may consist of paper, although it is preferred to employ a wrapper which consists of a film of polymeric material. The wrapper may, if desired, be coated with a film of a plasticiser for the material of the filament or fibres if this material is susceptible to plasticisation. The film of polymeric material may most suitably comprise a film formed from the same polymeric material as the filaments or fibres. Thus, in a preferred form of the invention, a cellulose acetate tow or sliver is fed to the condensing tube and wrapped with a film of cellulose acetate which has been coated with a film of a plasticiser for cellulose acetate. The film is thereby bonded to the outer layer of the filaments or fibres whereupon the cylindrical element is set in the desired shape.

While cellulose acetate is the preferred filamentary or fibrous material for use in the process of this invention, it will be appreciated that any known filamentary or fibrous material, suitable for the production of filter elements of the type described, may be used in the process of the invention including, for example, polyethylene, polyesters, polyamides and acrylonitrile polymers. The filamentary or fibrous material may also comprise a blend of polymeric material of these kinds with other filamentary or fibrous material, such as viscose, regenerated proteins or cotton.

The wrapper is preferably so treated that the edges thereof will join together as well as

[Price 4s. 6d.]

bond to the bundle of filaments or fibres. Thus, when paper is employed as wrapper it will normally be necessary to supply an adhesive at the region of overlap of the paper to secure the edges together. If a film of a polymeric material is employed as wrapper it will be necessary to supply additional material such as an adhesive or solvent for the polymer of the film. In certain cases a continuous feed of a solvent such as acetone may be employed at the join, and this may be preferable, for example, where both the bundle and the wrapper comprise cellulose acetate, in view of the rapid welding action of the acetone upon the film.

By the process of the invention there are obtained satisfactory filter elements without the

necessity for applying plasticiser to individual filaments or fibres. It is therefore unnecessary to apply plasticiser to a web of staple fibres or to a band of tow.

The invention is illustrated by the following Example.

EXAMPLE

Filter elements in the form of cigarette filter tips were made by preparing tubes of cellulose acetate film, the edges being sealed by solution with acetone, and compressing cellulose acetate tow into the tubes. The percentage by weight of tar retention (known as the "smoking efficiency") obtained is shown in the Table, which also shows the average of five typical results obtained with standard cellulose acetate filter tips.

Thickness of wrapper film (inch)	Smoking efficiency %	Average efficiency of reference tips %
4 × 0.001	35.7	38.4
5 × 0.001	27.3	
6 × 0.001	38.6	
7 × 0.001	36.8	
10 × 0.001	37.9	

WHAT WE CLAIM IS:—

1. A process for the production of filter elements which comprises forming a bundle of unplasticised filaments or fibres, condensing the bundle into a cylindrical shape of the required dimensions and applying around the formed cylindrical element a wrapper which is bonded to the outer layer of the bundle of filaments or fibres.

2. The process as claimed in Claim 1 in which the filter elements are made from crimped continuous filament material.

3. The process as claimed in Claim 1 or Claim 2 in which the filaments or fibres are of cellulose acetate.

4. The process as claimed in any preceding claim in which the wrapper is of paper.

5. The process as claimed in any preceding claim in which the wrapper is of the same material as the filaments or fibres.

6. The process as claimed in any preceding claim in which the wrapper is coated with a plasticiser for the material of the filaments or fibres.

7. The process as claimed in Claim 6 in which the wrapper is of a polymeric material with which the plasticiser is compatible.

8. The process as claimed in any preceding claim in which the wrapper is a polymeric material and the edges of the wrapper are overlapped and joined by applying to the wrapper in the region of overlap a solvent for that polymeric material.

9. The process as claimed in Claim 8 in which the wrapper is of cellulose acetate film.

10. The process as claimed in Claim 9 in which the solvent applied is acetone.

11. The process for the production of filter elements substantially as described in the Example herein.

12. Filter elements whenever produced by the process of any of the preceding claims.

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